Testimony to

The House Subcommittee on Water and Power

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Introduction

Chairman Radinovich, respected members of committee, thank you for inviting me to appear before you today. It is my honor to address the topic of clean water scarcity and to share our views on how advanced technologies can reduce the cost of providing clean water and increase long-term water availability in an economically sustainable way.

Background

GE is a global leader in diverse technologies and one of the world's most recognized brands. We invest over $3 billion on R&D annually and provide our customers with advanced technologies that reduce emissions, increase energy efficiency, enhance safety and security, and improve health care. GE Water & Process Technologies is a leading global provider of water treatment systems and services. Water is the lifeblood of industry, and our products and services conserve billions of gallons of water annually for our industrial customers. Our treatment systems also create safe, affordable water for millions of people living in water-scarce regions of the world from many sources, including

brackish water, sea water and recovered water. GE does this using multiple technologies, including reverse osmosis, electrodialysis, and treatment systems that remove impurities and improve water quality.

Water Scarcity is Spreading

As population increases and industrial development expands, the stress on water resources will continue to increase. According to the World Meteorological Organization, the number of people living in regions defined as "stressed" and "high stress" will increase from 4 billion in 1995 to nearly 6 billion in 2025 – an increase of 50% in 30 years. (Figure 1).

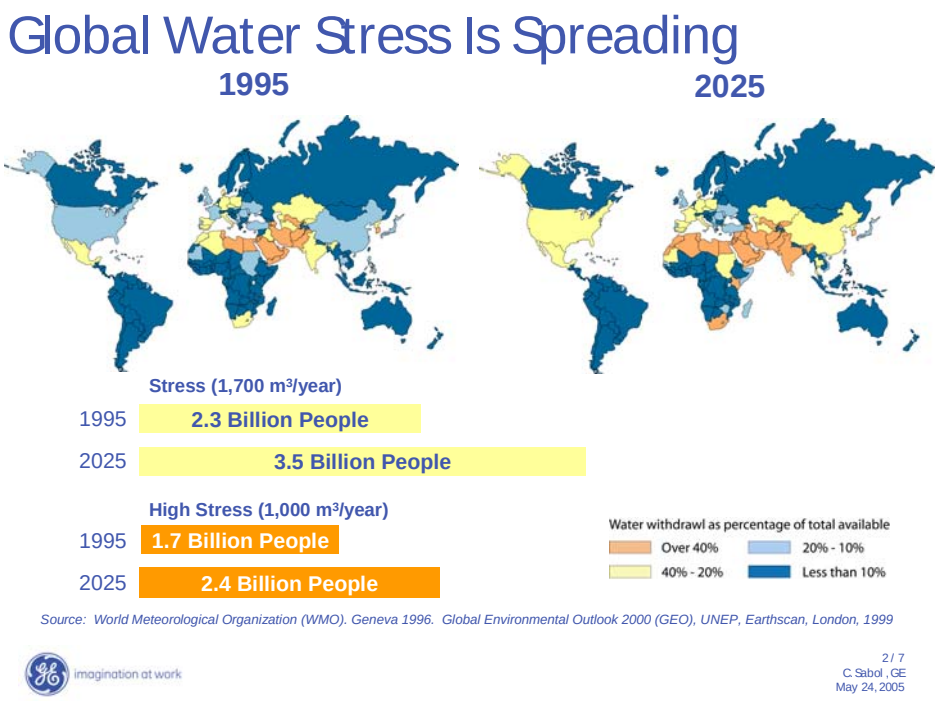

Figure 1: Global Water Stress

This is a global trend that can also be felt in the US due to shifts in population and impairment of existing water resources. For example:

- Increasing populations and high demand are depleting freshwater aquifers in the southwest US;
- Groundwater contamination is a growing problem in New England;
- Competition for water access in the Colorado river basin have created far-reaching economic and political tensions in that region;
- Lead and bacteria contamination have affected drinking water supplies in areas, including here in Washington DC.

Paradoxically –many regions of high stress have abundant water supplies nearby. The problem is one of access to clean, usable water. There are technology solutions to this problem. GE and other companies are able to provide technologies to convert seawater, brackish water and recovered water into useful water supplies. As demand increases, it will become increasingly important to reduce the cost of water by reducing capital cost, energy cost, and operating maintenance cost.

Economics of Water Treatment and Desalination

Water treatment costs vary by the amount of salt removal, type of technology, cost of energy, and size of plant. As shown in Figure 2, different water resources require different treatment technologies, and higher salinities have higher costs.

Desalination costs are dominated by capital investment, energy and maintenance costs. (Figure 3) Reverse osmosis systems, which utilize

membrane technology for water treatment, have the lowest cost of operations, especially in areas with high power cost.

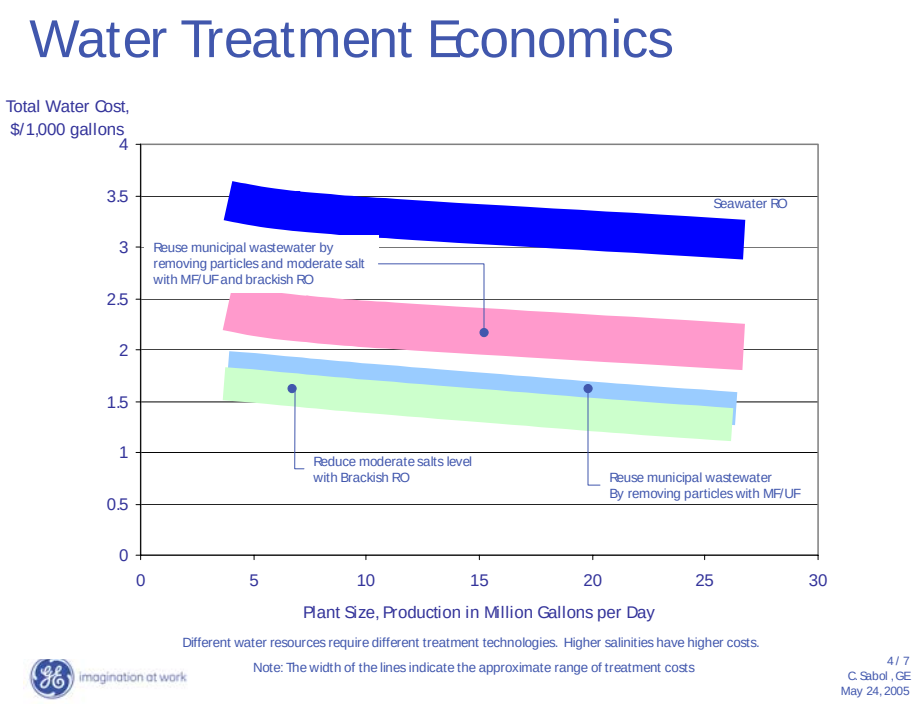

Figure 2: Desalination Costs by Method

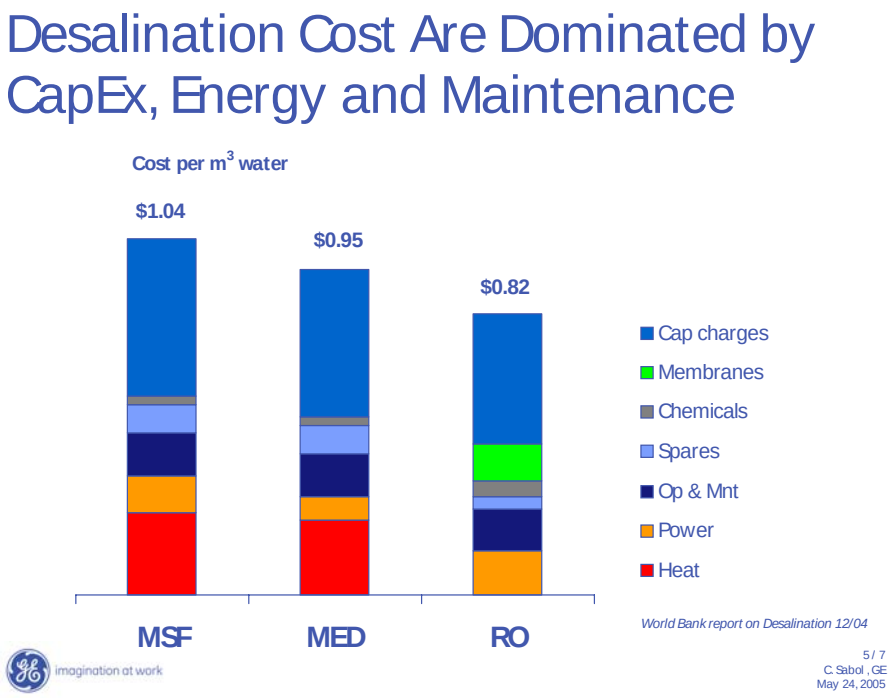

Figure 3: Desalination Cost Breakdown

Technology Advances Have Reduced Cost of Clean Water

GE and others have made great strides in reducing the cost of desalinating seawater using membranes, from over $20/K-gal in 1980 to under $4/K-gal today (Figure 4).

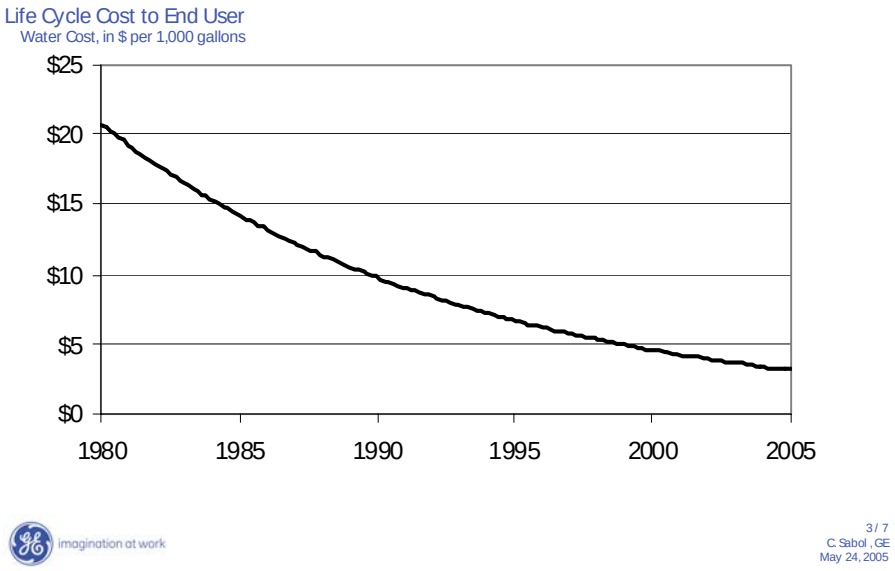

Figure 4: Reduction in Desalination Costs Over Time

While membrane technology advances have resulted in significant cost reductions, energy still accounts for up to 60% of the operating cost (Figure 5). Further improvements in energy efficiency will deliver sustainable reductions in operating cost. Along with improvements in energy efficiency, improvements in membrane performance and membrane life through integrated treatment systems can reduce capital cost and life cycle cost.

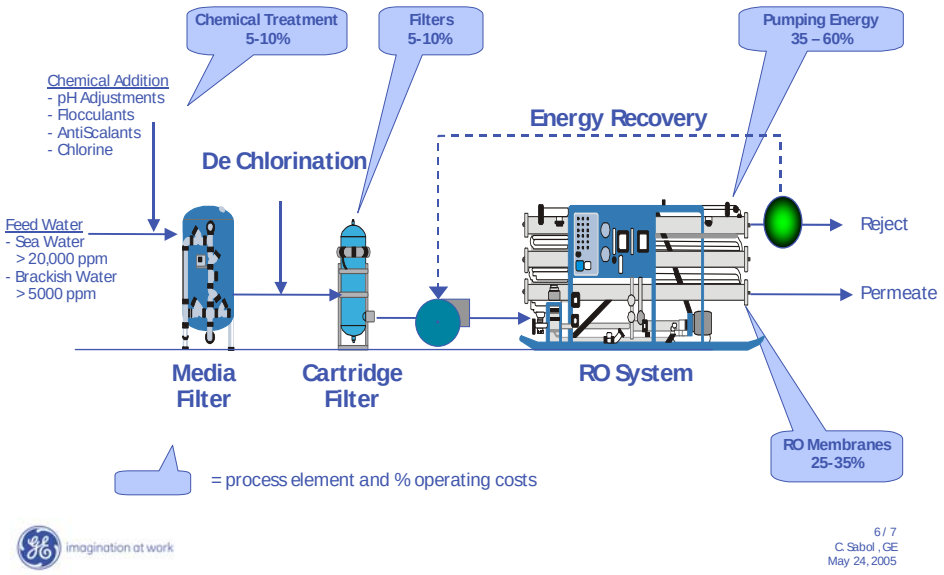

Figure 5: RO Desalination Process Costs

Roadmap for Sustainable Reduction in Clean Water Costs

Membrane-based treatment solutions are essential to creating new water sources such as brackish water aquifers, seawater, and even wastewater. Membrane based desalination is a proven solution, but a broader application of these technologies to create meaningful new water sources requires investment to further reduce the energy consumption associated with the operation of membrane systems.

Significant improvements in clean water cost can be achieved by investing in the development of:

- New membrane systems with improved energy efficiency;
- Higher flux membranes with increased capacity and lower capital costs;

- Higher efficiency of energy recovery systems to reduce energy costs;
- Integrated treatment systems and longer life membranes with higher resistance to chlorine that increase efficiency and reduce maintenance costs.

In addition, innovative financing models and tax incentives can reduce first cost and help accelerate the deployment of these new technologies.

GE is already investing in research to develop membranes that have lower energy consumption, improved life, and innovative integrated treatment systems. Furthermore, through government support, GE is looking at new systems such as the integration of membrane-based desalination and energy generated from wind turbines. We are committed to continuing our efforts in these areas, but government support will facilitate and accelerate these developments.

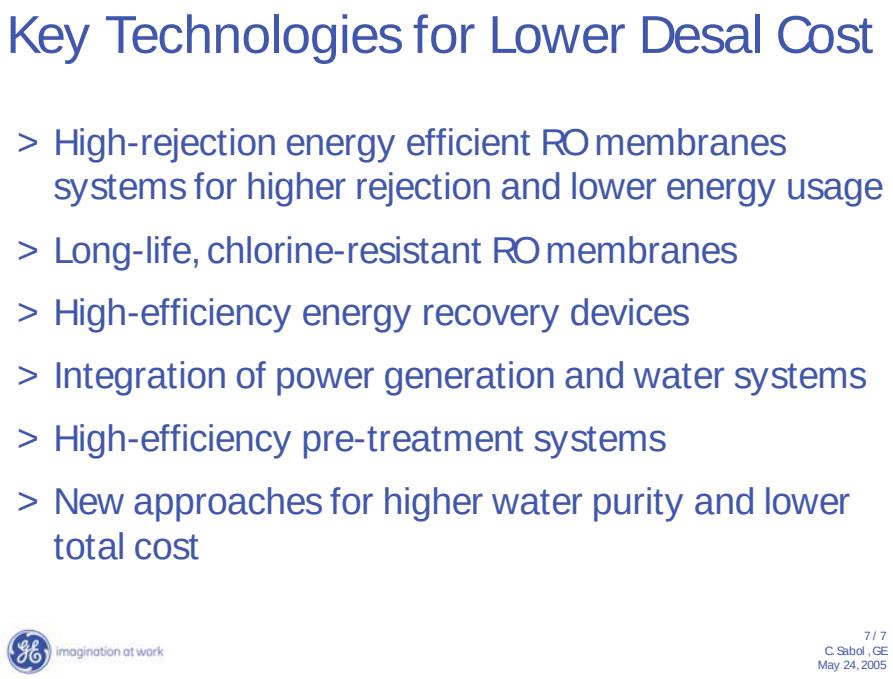

Figure 6: Technologies for Reducing Desalination Cost

Recommendations

We recognize the value of subsidies as effective means to encourage early adoption and deployment of solutions. Technologies exist today that are effective at removing salts and contaminants from water. Short-term assistance with energy cost will help communities in need put solutions in place faster.

However, we think that the long-term solution lies in advanced technologies that make clean water economical and sustainable. A broad research and development program focused on membrane advancements and improved energy efficiency could lead to a 30% reduction in operating costs, and a 25% reduction of capital costs. Additional efforts to develop integrated treatment

programs and innovative financing can further reduce the cost of clean water. This would encourage industry and potable water providers to reduce their reliance on surface water sources by fulfilling their demand with new water sources.

As a leader in the industry, GE looks forward to working with policymakers, users, and the technical community to continue to improve desalination technologies and increase the availability of clean water. Thank you Mr. Chairman and members of this committee for your time.

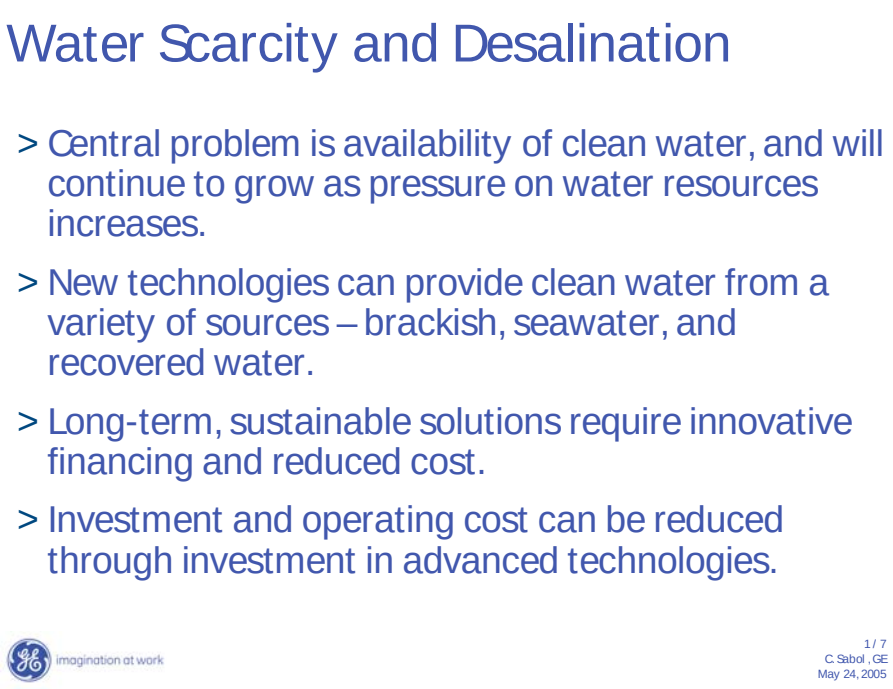

Figure 7: Summary